Vaccines Against Herpes Simplex Virus Infection
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BRIEF DESCRIPTION
Herpes simplex virus (HSV) infections affect billions of patients worldwide and can manifest its symptoms as painful blisters or ulcers at oral, ocular or genital locations. Symptomatic patients can currently only alleviate their pains with antiviral medication. These technologies propose a shift in focus toward novel protective epitopes as the foundation for new vaccines.

SUGGESTED USES
- Prevention of herpes simplex virus infection and symptoms (such as oral, ocular, or genital)
- Possibly Vaccinate individuals who have not been exposed to the herpes simplex virus
- Treatment of individuals infected with herpes to reduce recurrent symptoms

FEATURES/BENEFITS
- High conservation: vaccine should be effective despite different HSV-1 and HSV-2 strains
- Minimal side effects: vaccines avoid the potential for engaging other epitopes and accidentally triggering unwanted immune responses
- Localized: technique will mediate protective immunity at infection site
- Multiple stage effects: vaccine serve both to protect against infection and reduce symptoms in infected individuals

TECHNOLOGY DESCRIPTION
Herpes simplex virus type 1 (HSV-1), commonly referred to as herpes, is a virus infection that is mainly transmitted by oral-to-oral contact. Herpes simplex virus type 2 (HSV-2) is another form that commonly is transmitted through genital-to-genital contact. The virus can manifest itself as oral, genital, or ocular herpes and is a lifelong disease. Symptomatic patients suffer from frequent bouts of painful blisters or ulcers at the sites of infection. In particular, symptomatic patients with ocular-related HSV-1 infection have recurrent corneal disease and can eventually become blind. In HSV-2 genital herpes, virus shedding and transmission occurs through genital secretions. Standard viral medications, such as acyclovir, famciclovir and valacyclovir, only reduce severity and frequency of herpes symptoms. Ongoing clinical trials involving protein-based vaccines in this area have shown limited efficacy.

Technologies developed by UCI scientists utilize an innovative strategy to develop a novel herpes vaccine in incorporating newly discovered targets capable of eliciting an immune response. The vaccine will be able to harness the adaptive immunity of an infected patient to combat HSV-1 and HSV-2 infection and disease. This vaccine strategy focuses on T-cell based cellular immunity. The study showed strong therapeutic vaccine efficacy of the tegument proteins encoded by the HSV-2 UL40 and UL39 genes. In HSV-2 infected guinea pigs, an animal model that develops spontaneous vaginal shedding and recurrent genital herpetic disease similar to humans, the UL40 and UL39 tegument proteins delivered intravaginally in CpG and Alum adjuvants showed strong immunogenicity compared to gB and gD and to other tegument/capsid proteins VP11/12, VP13/14, VP16, VP22, and UL25.

STATE OF DEVELOPMENT
Studies examining safety, immunogenicity and protective abilities of HSV-1 and HSV-2 vaccines have been tested in animals.

RELATED MATERIALS
- Human Asymptomatic Epitope Peptide/CXCL10-Based Prime/Pull Vaccine Induces Herpes Simplex Virus-Specific Gamma Interferon-Positive CD107+ CD8+ T Cells That Infiltrate the Corneas and Trigeminal Ganglia of Humanized HLA Transgenic Rabbits and Protect against Ocular Herpes Challenge Khan, A.A., et. al. J. Virol, 2018, 92, e00535 - 06/13/2018
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